## REMARKS

In the Office Action dated November 5, 2009, and marked final, the Examiner maintains his rejections of claims 1, 4-6, 8-14 and 20-23 under 35 U.S.C. §103(a) as being unpatentable over Hisamitsu (2004/0126655) in view of Delnick (5,865,860); claim 3 under 35 U.S.C. §103(a) as being unpatentable over Hisamitsu in view of Delnick and in further view of Kung (5,389,471); and claims 15, 16, 24 -27 under 35 U.S.C. §103(a) as being unpatentable over Hisamitsu in view of Delnick and in further view of Triplett (3,566,985). The Examiner also rejects claim 7 under 35 U.S.C. §103(a) as being unpatentable over Hisamitsu in view of Delnick and in further view of Munshi.

Claims 2, 17-19 and 28-29 were previously canceled. With this Response, no claims are added, canceled or amended. After entry of this Response, claims 1, 3-16 and 20-27 remain pending in the Application. Reconsideration and entry of the Application is respectfully requested in light of the arguments made below.

*Rejection of claims 1, 4-6, 8-14 and 20-23 under 35 U.S.C. §103(a)*

The Examiner rejects claims 1, 4-6, 8-14 and 20-23 under 35 U.S.C. §103(a) as being unpatentable over Hisamitsu (2004/0126655) in view of Delnick (5,865,860).

Claim 1 (and claims 3-6, 8, 9, 20 and 21 that depend therefrom) recites in part individual insulating particles having a plurality of interstitial spaces therebetween, with electrolytes occupying at least some of the interstitial spaces. Each individual insulating particle in the pattern is selectively arranged directly on one of the cathode and anode, the individual insulating particles arranged such that the cathode and the anode do not contact each other.

The Examiner contends that Hisamitsu discloses all of the elements of claim 1 except for an electrolyte layer consisting of a pattern of individual insulating particles with electrolytes occupying the interstitial spaces. (Office Action, p. 2).

Hisamitsu discloses a cell comprising a positive and negative electrode, a collector, and an electrolyte. In addition, an insulating portion 400 is integrally formed by stacking these layers. The insulating portion 400 serves as the sealing member to reduce short

circuiting between cells. (¶ [0033]). Delnick discloses a cell comprising a positive and negative electrode, a collector, a thin separator layer 104, electrolyte and a gasket 114. The gasket bonded to the current collectors seals the perimeter of the stack, thereby preventing electrolyte leakage and thus short circuiting. (Col. 4, ll. 61-63). Applicants' cell does not need either an insulating layer around the perimeter as does Hisamitsu nor a gasket as does Delnick. Applicants' insulating particles provide means to prevent short-circuiting as the insulating particles keep the anode and cathode separate as recited in the claim, indicating the prevention of electrolyte leakage. (¶ [0044]). Neither Hisamitsu nor Delnick disclose individual insulating particles that are arranged such that the cathode and the anode do not contact each other. In both references, an additional gasket or peripheral layer is required to separate the cathode and anode. Thus, the combination of the two references fails to teach, suggest or render obvious the use of individual insulating particles arranged on one of the cathode or anode to separate the cathode and anode to prevent short circuit.

The Examiner contends that Delnick discloses a battery comprising an electrolyte layer comprising a porous separator structure with individual insulating particles of silica or alumina and a polymer binder wherein electrolytes are applied via ink-jet printing. (Office Action, p. 2-3). The Examiner also contends that it is inherent that the porous separator would consist of a pattern of insulating particles having interstitial spaces there between. The Examiner is ignoring the polymer binder. Delnick discloses that the separator layer 208 is made of a suitable mixture of a solid particulate and a polymer binder. (Col. 5, ll. 45-46). Particles binded together with polymer prior to applying the porous layer to the electrode do not teach or suggest individual insulating particles placed on an anode or cathode. As a matter of fact, interstitial spaces are inherently filled with binder. Therefore, the Examiner's inherency argument should be applied to the polymer binder rather than the electrolyte. In addition, the Examiner's response to arguments fails to address the polymer binder of the separator. Even if an ink-jet were used, the ink jet would place the polymer binder to bind the silica or alumina particles. The Examiner simply ignores polymer binder of the separator.

Furthermore, the Examiner contends that it would be obvious to incorporate the separator of Delnick into Hisamitsu. This will not result in the recited structure as neither discloses individual insulating particles and both require an additional gasket or other type layer to prevent short circuiting.

The separator of Delnick is clearly a "layer" as shown in FIG. 2 and as disclosed in the specification in col. 5, ll. 20-35 as follows.

> [T]he preferred porous layer 204 may comprise a bilayer structure which is comprised of a first layer 206 and a second layer 208. The first layer 206 comprises an electrode layer, for example an anode active electrode, disposed directly on the current collector substrate 202. The second layer comprises a separator layer 208 formed on top of the first layer 206 and having an upper surface 207. The first layer 206 and the second layer 208 form an interface 209 at their adjoining surfaces. The porous structure of the second layer 208 continuously extends into the first layer 206 through the interface 209.

Important in that disclosure is the upper surface 207 of the separator layer 208 that continuously extends into the first layer 206 through the interface 209. Clearly, this separator is not individual particles and is not intended to keep the cathode and anode from contacting each other, as it penetrates into the electrode layer. Thus, the gasket is required.

Neither Hisamitsu nor Delnick disclose individual insulating particles having a plurality of interstitial spaces there between, each individual insulating particle arranged such that the cathode and the anode do not contact each other.

Because neither Hisamitsu nor Delnick disclose the individual insulating particles as recited in claim 1, the combination does not teach, suggest or render obvious to one skilled in the art the use of insulating particles as recited in the claim. Applicants respectfully submit that claim 1 and its dependent claims 3-6, 8, 9, 20 and 21 are allowable over the cited combination.

Claim 10 (and claims 11-14, 22 and 23 that depend therefrom) recites a method for manufacturing a battery comprising applying individual insulating particles directly to at least one of a cathode and an anode, applying an electrolytic polymer to at least some of a plurality of

interstitial spaces between the individually applied insulating particles to form an electrolyte layer and layering the cathode and the anode such that the electrolyte layer is formed in between.

As noted by the Examiner on page 5 of the Office Action, Hisamitsu does not disclose the claimed method. The Examiner contends, however, that Delnick discloses applying individual insulating particles onto at least the cathode or anode and further filling the interstitial spaces with electrolyte. As argued above, the Examiner is ignoring the polymer binder of the Delnick separator and the fact that the separator layer 208 is applied as a layer rather than as individual particles. Accordingly, the combination of Hisamitsu and Delnick fails to teach, suggest or render obvious at least that element of claim 10. Applicants respectfully submit that claim 10 and its dependent claims 11-14, 22 and 23 are thus allowable over the cited combination.

In addition to its dependency from allowable claim 10, claim 12 includes additional features that make it allowable over the cited combination of references. Claim 12 describes that the electrolytic polymer is applied simultaneously with the individual insulating particles to form a solid electrolyte battery. The Examiner contends in his response to arguments that Hisamitsu discloses simultaneously applying electrolyte and separator. Hisamitsu discloses that the layers of the cell are formed *respectively* (¶ [0039]) or one after another as described in ¶[0040]. Hisamitsu states that because shape and position of the electrode terminals change, they can be simultaneously printed, as shown in Figs. 7A-7D. Hisamitsu does not disclose applying insulating particles and electrolyte at the same time because these go in the same basic space. Hisamitsu only discloses using more than one ink jet head at the same time to print on different surfaces. Therefore, the invention of claim 12 is not rendered obvious by the cited combination.

*Rejection of claim 3 under 35 U.S.C. §103(a)*

The Examiner rejects claim 3 under 35 U.S.C. §103(a) as being unpatentable over Hisamitsu in view of Delnick and in further view of Kung (5,389,471). Claim 3 depends from claim 1 to include all of the limitations therein and to further recite that a void ratio of the interstitial spaces to the individual insulating particles in the electrolyte layer is 50-90%. As the

Examiner notes on page 7 of the Office Action, neither Hisamitsu nor Delnick disclose this limitation. As explained earlier, neither Hisamitsu nor Delnick disclose individual insulating particles having a plurality of interstitial spaces therebetween, with electrolytes occupying at least some of the interstitial spaces. The Examiner states that interstitial spaces are inherent between the silica and alumina particles of Delnick. However, the Examiner is ignoring the polymer binder disclosed by Delnick that surely binds the particles in the interstitial spaces. Therefore, for the combination of Hisamitsu, Delnick and Kung to render claim 3 obvious, Kung must cure the deficiencies of Hisamitsu and Delnick. However, Kung also fails to disclose individual insulating particles having a plurality of interstitial spaces therebetween, with electrolytes occupying at least some of the interstitial spaces. Therefore, the cited combination of references does not teach, suggest or render obvious the elements of claim 3. Applicants respectfully submit that claim 3 is allowable over the cited combination for these reasons.

*Rejection of claim 7 under 35 U.S.C. §103(a)*

Claim 7 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hisamitsu in view of Delnick and in further view of Munshi. Claim 7 depends from claim 1 to include all of the limitations therein and to further recite that the individual insulating particles comprise olefin resins. As explained above, neither Hisamitsu nor Delnick disclose individual insulating particles having a plurality of interstitial spaces therebetween, with electrolytes occupying at least some of the interstitial spaces. Therefore, for the combination of Hisamitsu, Delnick and Munshi to render claim 7 obvious, Munshi must cure the deficiencies of Hisamitsu and Delnick. However, Munshi also fails to disclose individual insulating particles having a plurality of interstitial spaces therebetween, with electrolytes occupying at least some of the interstitial spaces. Therefore, the cited combination of references does not teach, suggest or render obvious the elements of claim 7. Applicants respectfully submit that claim 7 is allowable over the cited combination for these reasons.

*Rejection of claims 15, 16, 24 and 26 under 35 U.S.C. §103(a)*

The Examiner rejects claims 15, 16, 24 and 26 under 35 U.S.C. §103(a) as being unpatentable over Hisamitsu in view of Delnick and in further view of Triplett (3,566,985).

Claims 15 and 16 (and claims 24 and 26 by their dependency) recite in part a battery assembly comprising multiple connected batteries, wherein each of the connected batteries comprises an electrolyte layer consisting essentially of individual insulating particles individually applied directly to at least one of the cathode and the anode and affixed thereto, and electrolytes occupying at least some of a plurality of interstitial spaces between the individual insulating particles.

Triplett is cited for the electric vehicle driven by an electric motor powered by a DC battery having a plurality of cells. However, as explained above, neither Hisamitsu nor Delnick, alone or in combination, teaches, suggests or renders obvious an electrolyte layer consisting essentially of a pattern of individual insulating particles and electrolyte, each individual insulating particle in the pattern being selectively arranged directly on one of the cathode and anode as recited in claims 15 and 16. Triplett in combination with these two references fails to cure this deficiency as Triplett also fails to teach or suggest such an electrolyte layer. Applicants therefore respectfully submit that claims 15 and 16, and claims 24 and 26 by their dependency, are allowable.

*Conclusion*

Reconsideration of the Application is requested. It is respectfully submitted that this Response places the application in suitable condition for allowance; notice of which is requested.

If the Examiner feels that prosecution of the present Application can be expedited by way of an Examiner's amendment, the Examiner is invited to contact undersigned at the telephone number listed below.

Respectfully submitted,

YOUNG BASILE
HANLON & MACFARLANE, P.C.

Francine B. Nesti
Registration No. 53376
(248) 649-3333

3001 West Big Beaver Road, Ste 624
Troy, Michigan 48084-3107